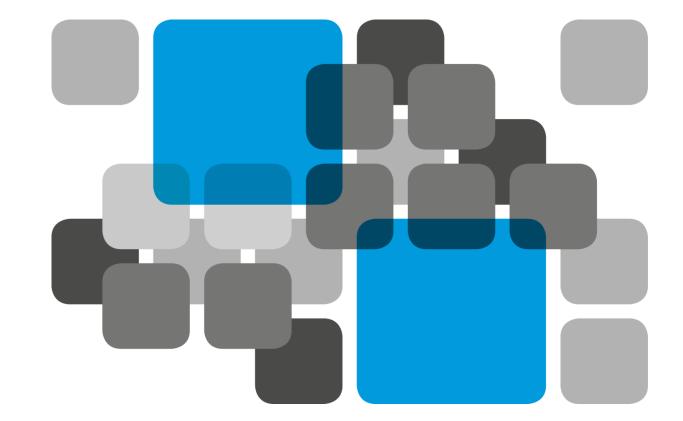


Pricing Trend Mechanics of Manganese Alloys and Ores

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- Recent developments
- Short-term outlook
- Medium-term outlook
- Impact from Malaysian supply



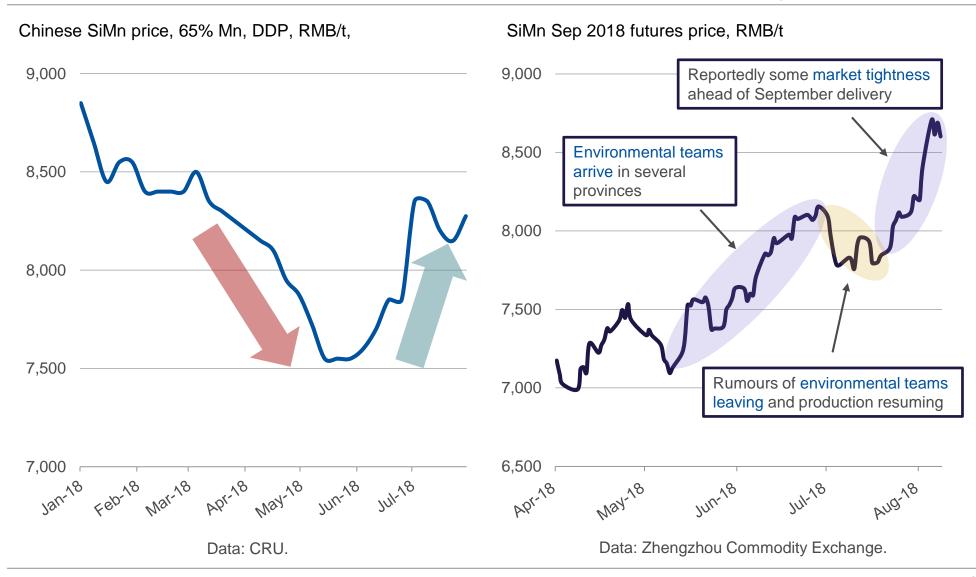


Recent developments

- New round of environmental checks in China drives ferroalloy prices sharply up
- Manganese ore prices also move higher, but to a much smaller extent
- Ferroalloy prices fall elsewhere in the world, severely squeezing profit margins



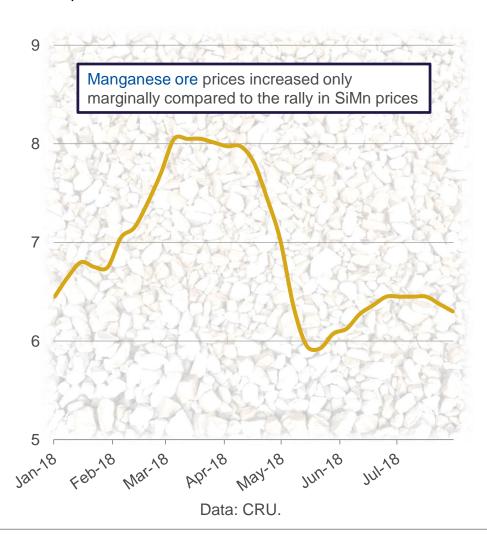
After sharp falls, Chinese SiMn prices increased again



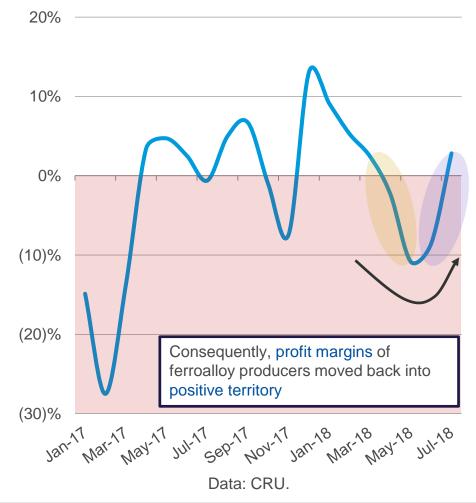


Chinese profit margins improved sharply in July

Mn ore price, 36-39% Mn, CIF China, \$/dmtu



Notional profit margins of Chinese SiMn producers, %

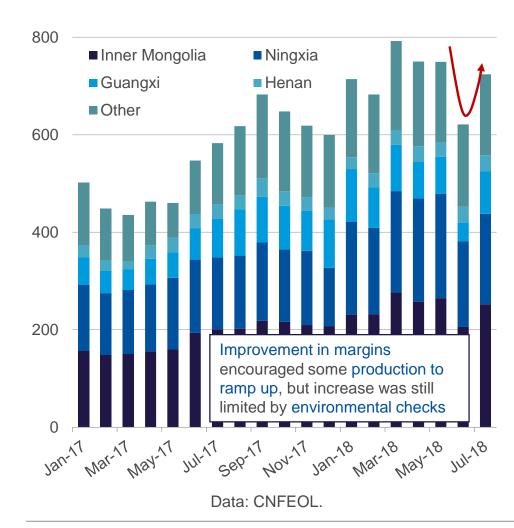


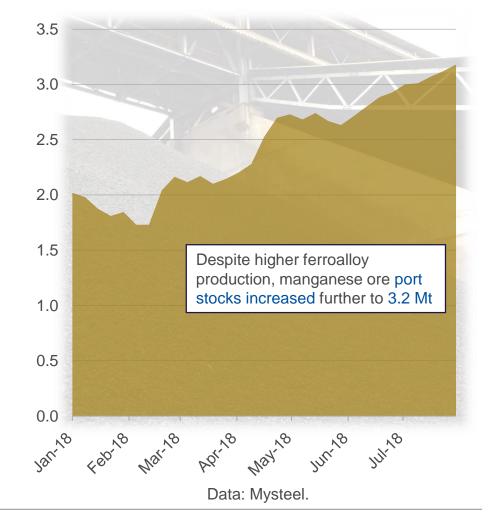


Chinese ore port stocks continued to climb through July

SiMn production in China, '000 t

Manganese ore stocks at Chinese ports, Mt



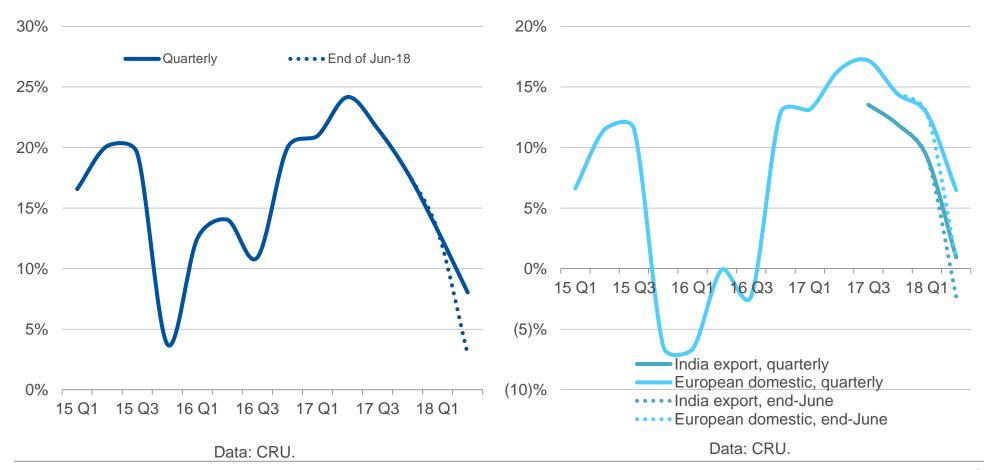




Margins of ferroalloy producers got squeezed by end-Q2

Notional profit margins for European SiMn producers, %

Notional profit margins of Indian SiMn producers based on Indian export price and on European domestic price, %



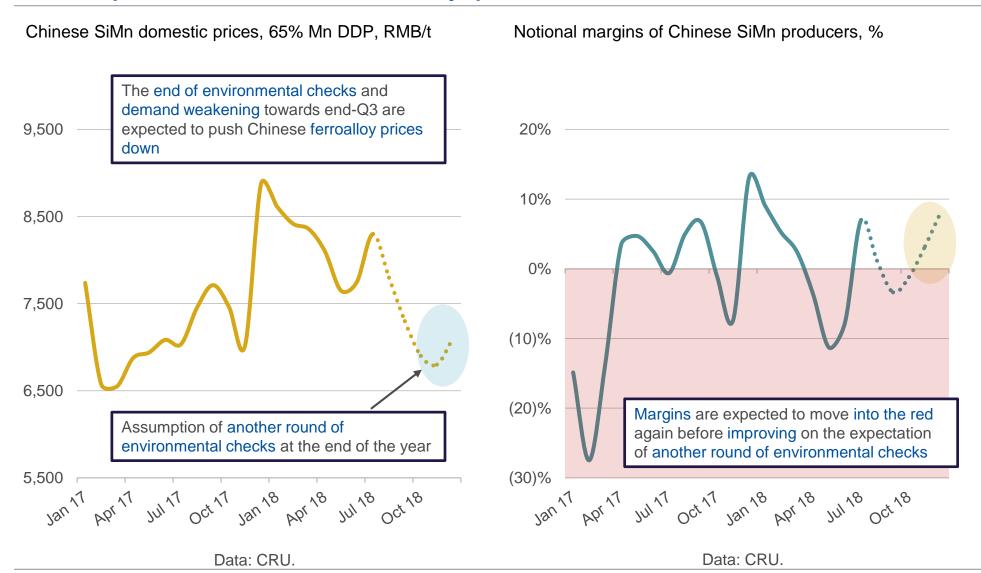


Short term outlook

- Now a prominent Ferroalloy prices in China expected to fall back through H2
- In the base case, we now assume there will be environmental checks at end-2018
- > The manganese ore market is oversupplied and prices will fall
- There will be downward pressure on ferroalloy prices elsewhere in the world from excessive supply

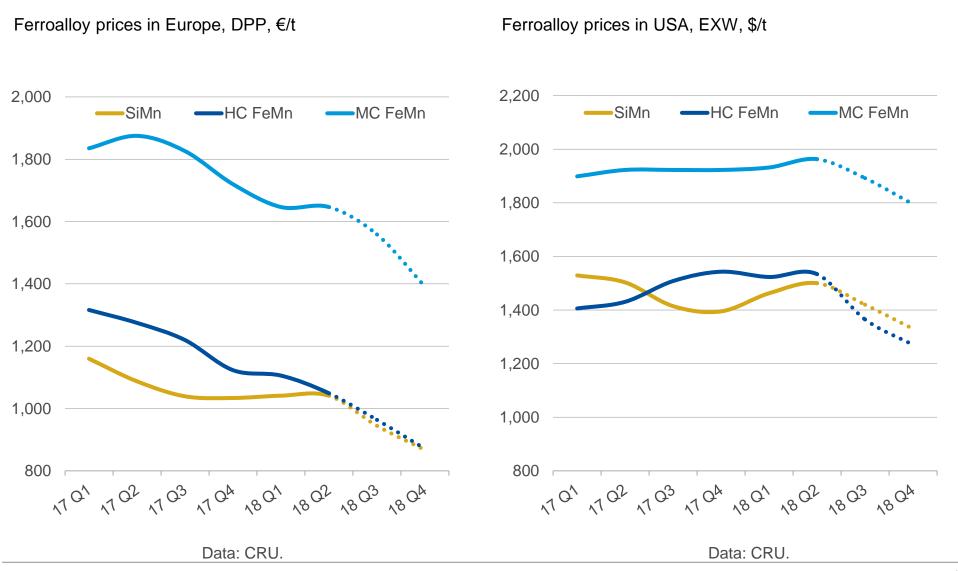


We expect Chinese ferroalloy prices to fall in H2





In the rest of the world, prices are also expected to fall

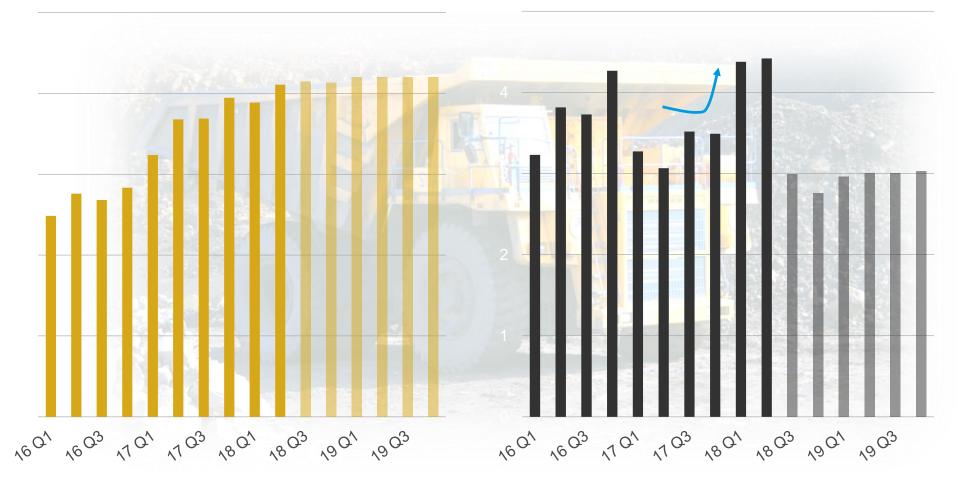




Supply of manganese ore has been running high

South African manganese ore production, Mt

Chinese manganese ore production, Mt

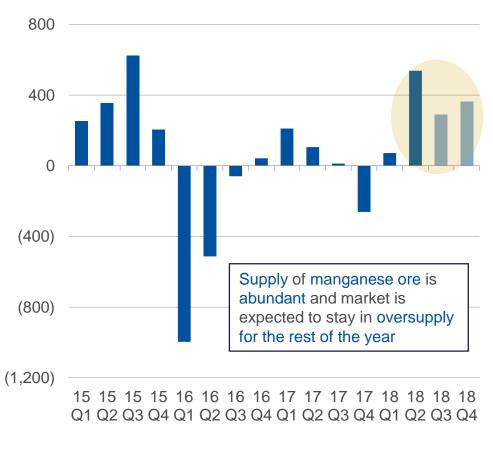


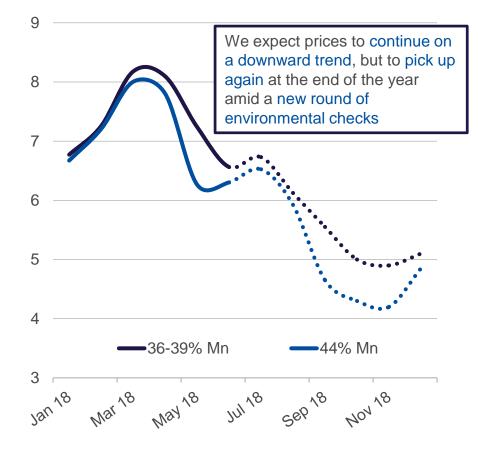
Data: CRU. Data: CRU.



Ore prices to fall on oversupply and lower alloy prices

Manganese ore market balance including exports from South African stocks and Chinese port stocks, Mn contained basis, '000 t Manganese ore prices, CIF China, \$/dmtu





Data: CRU. Data: CRU.



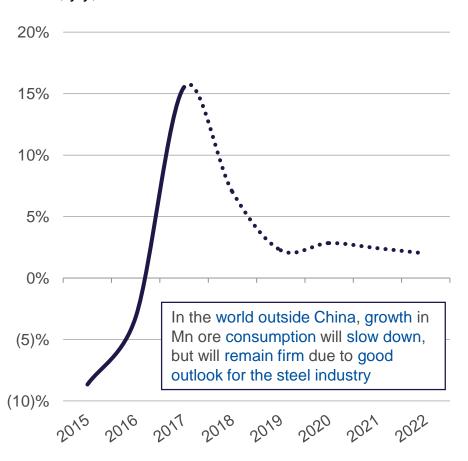
Medium term outlook

- Medium-term picture still positive, despite anticipated lower price levels
- > Ferroalloy and manganese ore demand will continue growing across the world
- > Chinese manganese ore imports will keep rising
- Increasing ferroalloy capacity utilisation will drive prices higher through 2022

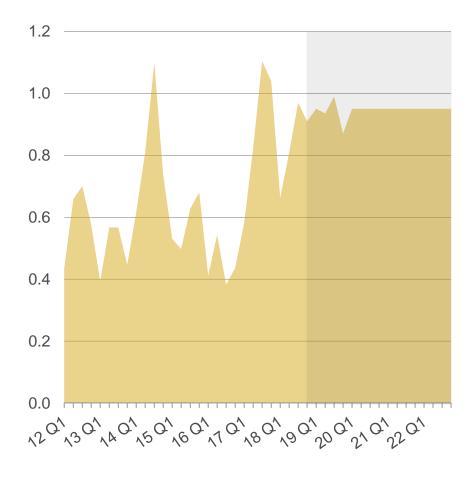


Mn ore demand outside China will keep rising

Manganese ore consumption growth in the world outside China, y/y, %



Indian manganese ore imports, gross tonne basis, Mt



Data: CRU.

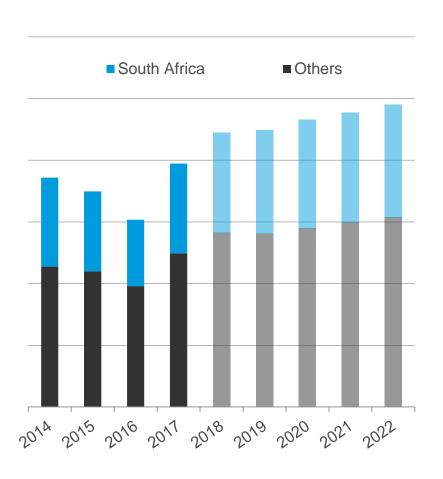
Data: CRU, IHS GTIS.

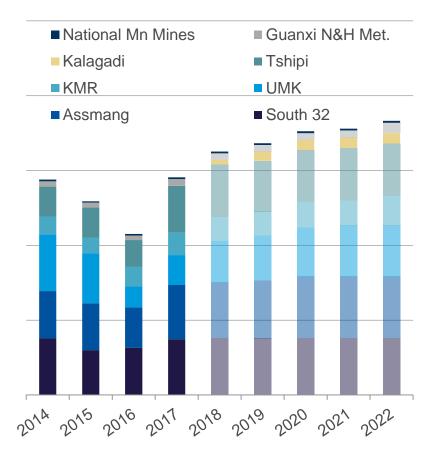


Supply of Mn ore will keep growing with rising demand

Mn ore production in the world outside China, Mt

Mn ore production in South Africa, Mt



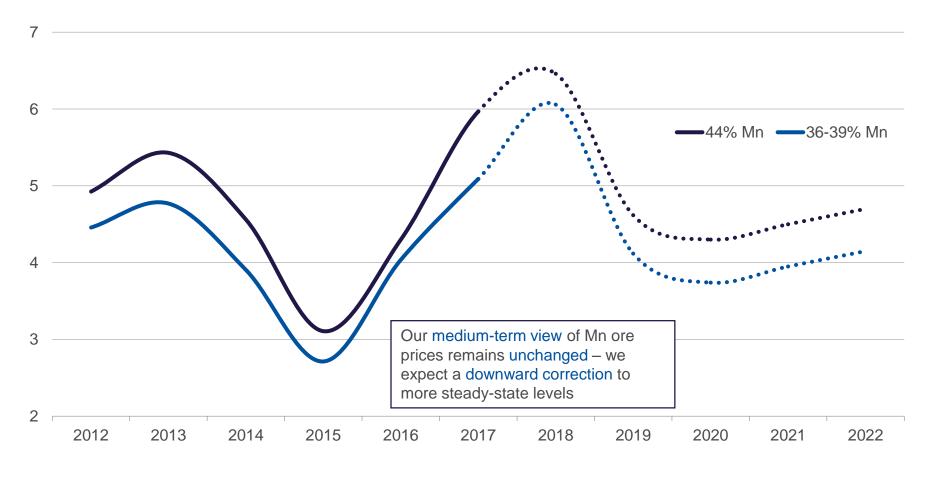


Data: CRU. Data: CRU.



Prices will return to slow growth after a sharp correction

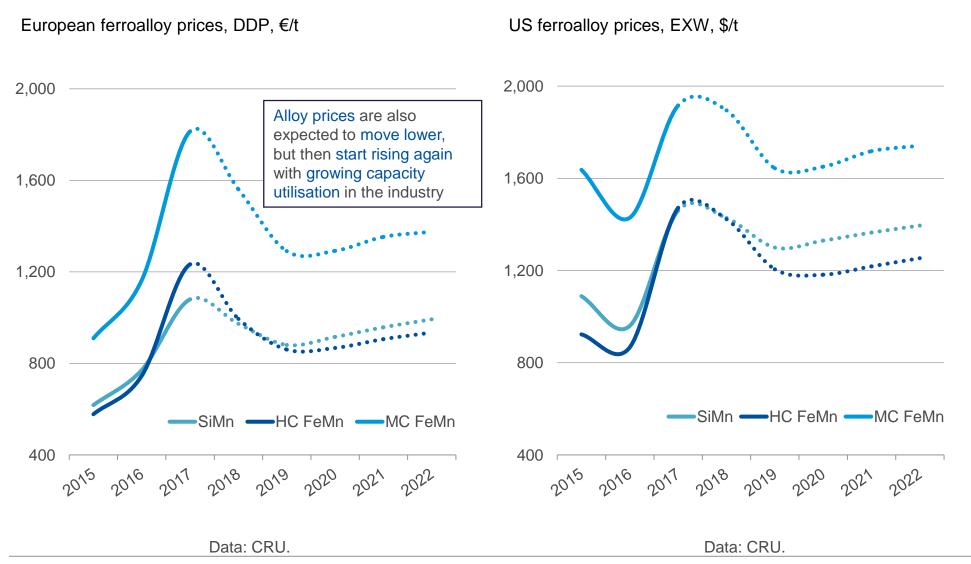
Manganese ore prices, CIF China, \$/dmtu



Data: CRU.



Ferroalloy prices will bottom out in 2019 on annual basis





Impact from Malaysian supply

- Now a prominent exporter to JKT
- Prices driven by marginal producers like India



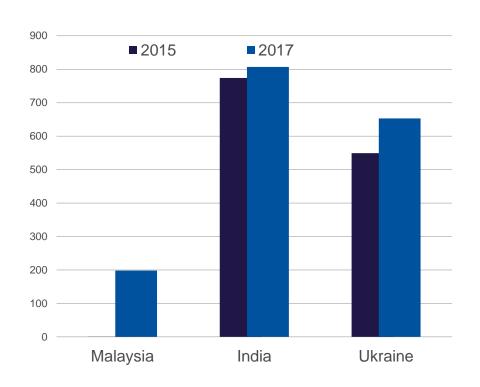


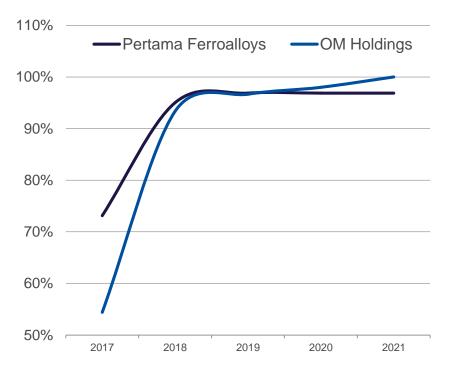
Malaysian presence has grown significantly in Asian market

Malaysia ranked the **5th largest** SiMn exporter in the world in 2017

annual silico-manganese exports by country, kt

Malaysian plants are rapidly maximizing production annual capacity utilisation, %





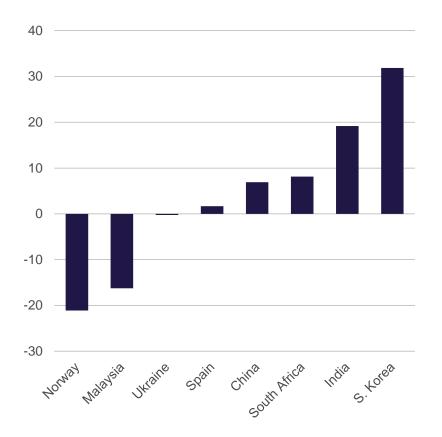
Data: CRU, IHS Data: CRU.



Low-cost Malaysian supply wont drive prices in the long term

Outside of Malaysia, Asian electricty prices remain high

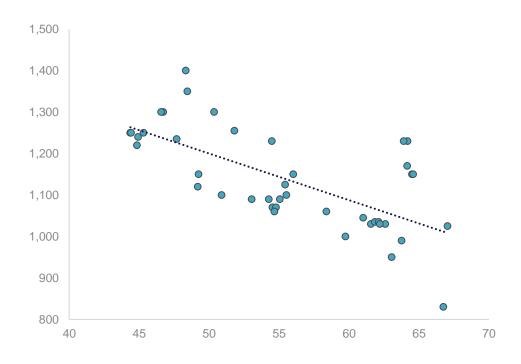
SiMn power rate in 2018 relative to inustry average, \$/MWh



Prices of Indian SiMn exports are sensitive to USD/INR exchange rate

x axis: USD/INR exchange rate

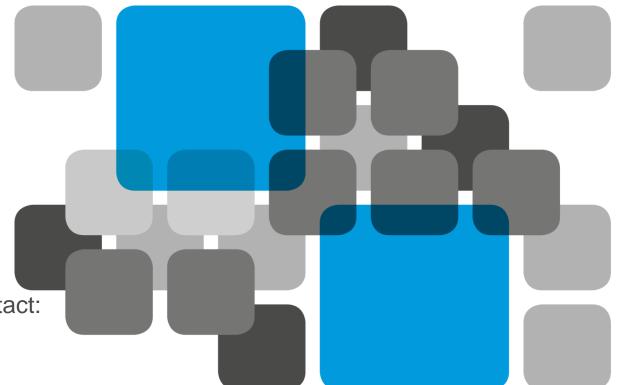
y axis: Silicomanganese Japan 65% Mn CIF (IO)



Data: CRU, IHS Data: CRU.



Thank you



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